



Fresh Air Intake Pre - filtering Device for Make - Up Air

Field of the Invention

This invention is in the field of furnace forced air heating air circulation for make - up air.

Background of the Invention

Field of the invention: A supply of make - up and combustion air is required for buildings with forced air heating from furnaces with a combustion chamber that burns fuel of natural gas or oil. Buildings made airtight rely on the make - up air supply to maintain a neutral or positive pressure so products from combustion don't enter the inhabited areas. While the forced air fan is operating it will draw in through the fresh air intakes upward of 180 to 125 cfm or what calculates into 10% of the make - up required for the building's particular furnace circulating system.

Where screens are required on air intakes supplying make - up air, the building code requires that the screens with less than 1/4 inch, it's gross area shall be three times greater than the duct it serves. They shall be removable without any special tools and made of a none corrosive resistant material.

Description of the Related Art: In art, a device has been introduced for supplying make - up air to the forced air furnace circulating system as shown by Kogut, Jimmy A. US Patent 4,509,681, is known to use the same standard screen openings, 1/4 inch, which is not removable for cleaning on the fresh air intakes. Screens of this nature are known to plug up with debris, freeze up with frost and snow, imposing difficulty on the air intakes to supply the make - up air, thereby creating a negative pressure and allowing products of combustion into the inhabited areas, possibly at unsafe levels.

Studies show these air intakes develop a build up over time by allowing insects, mice, pollens, dust mites, allergens, and air borne bacteria to enter the furnace's circulating system, this accumulation and confinement has raised some health concerns.

References Cited

- 10-1991 Tubbelsing et al, CL.454/365 is a roof vent and is not designed for heating circulation systems.
10 04-1985 Kogut, CL.126/112 clearly states the screen 58 is a conventional industrial wire screen of the type having wire barbs at each of the screen intersections and a mesh similar to a window screen.
15 This wire screen is a standard 1/4 in. screen used on all heating make-up air intakes for the past forty years.
- Summary of the Invention**
- 20 The invention is directed to a furnace forced air heating make- up air circulating system for a building, relating more to residential homes. A pre - filtering device being mounted on an outside wall of a building and connected to the make - up air inlet conduit to the return air duct accomplishes a better quality make - up air. Further, in accordance with this invention, while the furnace fan is operating the 10% of make - up air required is being drawn through the pre - filtering device stops most pollutants such as dust mites, pollens, allergens, and air-borne bacteria as well as insects, before entering through the wall and into the return air duct.
- 25 Further, in accordance with this invention, an aluminum frame with a raised pattern grill allows the frost to build up and dissipate through the filter medium in the winter months.
- 30 Further, in accordance with this invention, there are no special tools required for installing, removing for service, or cleaning of the screen.
- 35 In the following detailed description and drawings that follow, a more complete understanding of the invention will be obtained.
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Description of the Several Views of the Drawing (s):

Fig. 1 Show a side evaluation view of the pre - filtering device with its specifications

Fig. 2 Is a side evaluation view showing the embodiment of the invention

Fig. 3 This is a view showing a one - piece housing and flange for mounting on an outside wall with the tab for releasing the filter.

Fig. 4 Is showing a rear view that's placed against the wall for mounting as well as the groove in the inverted flange.

Fig. 5 This is the same as figure No. 4 showing the inverted flange and depth of the intake opening

Fig. 6 Shows a side evaluation view of how the filter is installed and uninstalled with a view of the filter and screen with it's raised pattern grill.

Drawings previously submitted and accepted.

Detailed Description of Invention:

As shown in the drawings, a fresh air intake pre - filtering device is made as a one piece, polyethylene injected molded vent adapted to be mounted on an outside wall of a building. The vent has a planar base (1) with an opening, and an integrally connected inverted flange around the opening. The inverted flange (5) is invert in such a manner that it creates a circumferential groove open towards the wall. A fresh air conduit which is inserted into a fresh air intake opening in the building wall is placed in the grieve allowing the vent to be flush mounted on the wall.

A weather protecting housing (2) or hood protrudes from the base above the opening and the inverted flange and has at its facing downwardly open end a screen and a filter (8), both easily removable for cleaning. The screen and filter are placed in a seat (4) molded in the opening or the hood and are easily released and removed by pulling a

pull tab (3) at the front and of the seat. In order to reinstall the filter and screen, both of them should be inserted towards the back end of the seat and placed at 120 degree angle on two rear tabs then the front should be raised to achieve horizontal position of the filter and screen locking the latter tight in the seat. The requirements for the filter (8) are the following: a frame of the filter and the screen (9) have to be made of a corrosion and moisture resistant material, and having low initial pressure resistant since filters have tendency to freeze up.

The best combustion to accomplish desired filtering and fresh air supplying action consists to the following:

- an aluminum frame, e.g. 7.5" by 8.0", enclosing a screen made as a two sided raised pattern grill;
- a filter made of 100% synthetic fiber;
- 0.06 w.g. initial pressure resistance at 100cfm.

The raised pattern grill allows the frost to build up, keeping it off the filter and at the same time leaving openings for the air to flow through.

The venting and filtering device can be installed in a new system as well as in existing one after an existing rain cap is removed

The filter may be made from a material distributed in Canada and U. S .A. under the trade name RX PolyMed.

The Embodiments of The Invention are Defined as Follows:

Claim 1 - A pre-filtering device for removing contaminants from fresh air supplied to a forced air heating circulating system in a building comprising:

a one piece polypropylene molded vent having a planar base adapted to be installed on an outside surface of the building, the base having a circular opening and an inverted flange along the circumference of the opening, the inverted flange protruding outwardly from the base, and thereafter inwardly creating a circumferential groove opened toward the wall to accommodate a fresh air supply

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